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Dependence of fluid flows in an evaporating sessile droplet on the characteristics of the substrate LEV BARASH, Landau Institute for Theoretical Physics — Temperature distributions and the corresponding vortex structures in an evaporating sessile droplet are obtained by performing detailed numerical calculations. A Marangoni convection induced by thermal conduction in the drop and the substrate is demonstrated to be able to result not only in a single vortex, but also in two or three vortices, depending on the ratio of substrate to fluid thermal conductivities, on the substrate thickness and the contact angle. The "phase diagrams" containing information on the number, orientation and spatial location of the vortices for quasistationary fluid flows are presented and analysed. The results obtained demonstrate that the fluid flow structure in evaporating droplets can be influenced in a controlled manner by selecting substrates with appropriate properties.

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